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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,859	08/30/2001	Kyusik Sin	1012-003	2190

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EXAMINER

CHEN, TIANJIE

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/943,859

**Applicant(s)**

SIN ET AL.

**Examiner**

Tianjie Chen

**Art Unit**

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10-12, 15-17 and 20 is/are rejected.
- 7) ☒ Claim(s) 4, 9, 13, 14, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## ***Non-Final Rejection (RCE)***

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/18/2004 has been entered. Claims 1-20 are pending.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 6, 7, 11, 12, 15-17, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Gill (US 6,606,781).

With regard to claims 1 and 11, Gill et al shows a hard bias spin-dependent tunneling sensor and a method of manufacturing in Fig. 13 including: a first lead 80 (Column 4, lines 56-57); a hard magnet 305 over the first lead; a free layer 320 over the hard magnet 305; a tunneling barrier layer

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325 over the free layer; a first pinned layer 346 over the tunneling barrier layer; a nonmagnetic coupling layer 347 over the first pinned layer; a second pinned layer 348 over the nonmagnetic coupling layer; a pinning layer 335 over the second pinned layer; and a second lead 82 over the pinning layer.

With regard to claims 6 and 16, Gill shows a hard bias spin-dependent tunneling sensor and method of manufacturing in Fig. 3 including: an inherent substrate; a shield/first lead 80 of a conductive material over the substrate; a hard magnet 305 made of PtMn containing Mn formed over the shield/first lead, a free layer 320 of NiFe containing iron and nickel formed over the hard magnet, a tunneling barrier layer 325 made of alumina containing aluminum formed over the free layer, a nonmagnetic coupling layer 347 containing Ru formed over the first pinned layer 346, a second pinned layer 348 made of Co formed over the nonmagnetic coupling layer 347, a pinning layer 335 made of PtMn containing Mn formed over the second pinned layer 348, a shield/second lead 82 of a conductive material formed over the pinning layer.

With regard to claims 2, 7, 12, and 17, Gill further shows a first gap spacer 302 made of nonmagnetic, hard, and conductive material Ta over the first lead 80; and a second gap spacer 337 made of nonmagnetic, hard, and conductive material Ta over the pinning layer 337; the free layer 320 is equally spaced from the first and second leads.

With regard to claims 15 and 20, Gill further an insulator as an inherent enclosure formed over the hard magnet and around the free layer, the tunneling barrier layer, the first pinned layer, the nonmagnetic coupling layer, the second pinned layer, and the pinning layer.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3, 5, 8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Khan et al (US 6,495,311).

With regard to claims 3 and 8, Gill's method includes: forming first gap layer; and forming the hard magnet 305 includes forming the hard magnet around the first gap spacer 302.

With regard to claims 5 and 10, Gill's method includes: forming the free layer, the tunneling barrier layer, the first pinned layer, the nonmagnetic coupling layer, and the pinning layer; and including: forming an inherent insulator over the hard magnet and around the free layer, the tunneling barrier layer, the first pinned layer, the nonmagnetic coupling layer, the second pinned layer and the pinning layer for as an enclosure of the device.

Gill does not show that bilayer process is used in the methods.

Khan shows a method of manufacturing magnetic head, wherein bilayer process is used in manufacturing (Column 2, lines 45-49).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use bilayer process in Gill's method of manufacturing. The rationale is as follows: Khan et al teaches that the bilayer process can be used to form a clean edge for the layer deposited (Column 2,

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lines 45-49). One of ordinary skill in the art would have been motivated to use bilayer process to obtain a clean edge for the layers.

***Allowable Subject Matter***

4. Claims 4, 9, 13, 14, 18, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- Claims 4, 9, 14, and 19, as the closest reference, Gill (US 6,606,781) shows a hard bias spin-dependent tunneling sensor and a method of manufacturing: a first lead; a hard magnet over the first lead and a seed layer, **but fails to show** that the seed layer is formed in the recess of the first lead.
- With regard to claims 13 and 18, Gill **fails to show** that the hard magnet is formed around and in contact with a first gap spacer.
- Applicant asserts: because the various layers are fabricated after fabrication of the hard magnets, the cause of shorting by hard biasing is eliminated. Further, the read track width of the SDT read sensor is controlled by the hard magnet contacting the free layer and thus the variation of read track width is smaller than that in a conventional hard biasing system (Specification p. 9, lines 9-14).

***Response to Arguments***

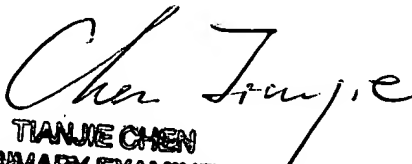
5. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on Flexible.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
TIANJIE CHEN  
PRIMARY EXAMINER